CLAIMS

1. A method of forming a metal pattern, comprising the steps of:

(I) forming on a substrate a polymer layer in which a polymer having a functional group that interacts with an electroless plating catalyst or a precursor thereof is chemically bonded directly to the substrate in a pattern form;

(II) adding the electroless plating catalyst or precursor thereof to the polymer layer; and

(III) forming a metal layer in the pattern form by electroless plating.

2. The metal pattern forming method according to Claim 1, wherein the step (I) further comprises:

a step of forming a polymerization initiating layer in which a polymer having, on a side chain thereof, a crosslinking group and a functional group having polymerization initiating capability is immobilized by a crosslinking reaction on a base material; and

a step of forming a polymer layer in which a polymer having a functional group that interacts with the electroless plating catalyst or precursor thereof is chemically bonded in the pattern form directly onto the polymerization initiating layer.

3. The metal pattern forming method according to Claim 1, wherein the step (I) further comprises:

a step (I-1-1) of forming on the substrate a polymer layer by chemically bonding a polymer which has a functional group whose structure is changed to a structure that interacts with the electroless plating catalyst or precursor thereof or loses the interaction capability with the electroless plating catalyst or precursor thereof, due to application heat, acid, or radiation; and

a step (I-1-2) of forming, in the pattern form, a polymer layer that interacts with the electroless plating catalyst or precursor thereof, due to application of heat, acid, or radiation to the polymer layer in the pattern form.

4. The metal pattern forming method according to Claim 3, wherein the substrate in the step (I-1-1) is a substrate having a polymerization initiating layer in which a polymer having, on a side chain thereof, a crosslinking group and a functional group having polymerization initiating capability is immobilized by a crosslinking reaction on a base material.

5. The metal pattern forming method according to Claim 1, wherein

the step (I) further comprises:

a step (I-2) of contacting a compound having a polymerizable group and a functional group that interacts with the electroless plating catalyst or precursor thereof with the substrate, irradiating the substrate with radiation in the pattern form, chemically bonding the compound

directly to the substrate, and thus forming, in the pattern form, a polymer layer that interacts with the electroless plating catalyst or precursor thereof.

6. The metal pattern forming method according to Claim 5, wherein the substrate in the step (I-2) is a substrate having a polymerization initiating layer in which a polymer having, on a side chain thereof, a crosslinking group and a functional group having polymerization initiating capability is immobilized by a crosslinking reaction on a base material.

7. The metal pattern forming method according to Claim 1, wherein the step (I) further comprises:

a step (I-3-1) of forming on a base material a photosensitive layer containing a light to heat conversion substance and a binder, and forming a polymer layer by chemically bonding a polymer having a functional group that interacts with an electroless plating catalyst or a precursor thereof directly onto the entire surface of the photosensitive layer; and

a step (I-3-2) of forming, in the pattern form, a polymer layer that interacts with the electroless plating catalyst or precursor thereof by irradiating the polymer layer with radiation in the pattern form and ablating the photosensitive layer.

8. The metal pattern forming method according to Claim 7,

wherein the photosensitive layer in the step (I-3-1) is a polymerization initiating layer in which a polymer having, on a side chain thereof, a crosslinking group and a functional group having polymerization initiating capability is immobilized on the base material by a crosslinking reaction.

9. The metal pattern forming method according to Claim 1, further comprising a step of carrying out drying after the step (III).

10. The metal pattern forming method according to Claim 1, further comprising a step (IV) of carrying out electroplating after the step (III).

11. The metal pattern forming method according to Claim 10, further comprising a step of carrying out drying after the step (IV).

12. The metal pattern forming method according to Claim 1, wherein the substrate is a substrate having a surface roughness of 500 nm or less.

13. A metal pattern having a metal layer locally formed on a substrate having a surface roughness of 500 nm or less, wherein the adhesiveness between the substrate and the metal layer is 0.2 kN/m or more.

14. The metal pattern according to Claim 13, wherein the metal layer is a metal layer formed on the substrate by forming a polymer layer in which a polymer having a functional group that interacts with an electroless plating catalyst or a precursor thereof is chemically bonded in a pattern form directly on the substrate, adding the electroless plating catalyst or precursor thereof to the polymer layer, and carrying out electroless plating on the polymer layer.

15. The metal pattern according to Claim 13, wherein the metal layer is a metal layer formed on the substrate by forming a polymer layer in which a polymer having a functional group that interacts with an electroless plating catalyst or a precursor thereof is chemically bonded in a pattern form directly on the substrate, adding the electroless plating catalyst or precursor thereof to the polymer layer, and carrying out electroless plating on the polymer layer, and the polymer layer a region having dispersed therein fine particles comprising at least one of electroless plating catalyst particles and metal particles deposited by the electroless plating, in a content of 25% by volume or more, and the region extending 0.05 μm or more from the interface of the polymer layer and the metal layer in a direction toward the substrate.

16. The metal pattern according to Claim 13, wherein the substrate is a substrate having a surface roughness of 100 nm or less.

17. The metal pattern according to Claim 13, wherein the

substrate is a substrate comprising a insulating resin having a dielectric loss tangent of 0.01 or less at 1GHz.

18. The metal pattern according to Claim 13, wherein the substrate is a substrate consisting of a insulating resin having a dielectric constant of 3.0 or less at 1GHz.

19. A printed wiring board, wherein the metal pattern according to Claim 17 or 18 is used as a conductive layer.

20. A method of forming a conductive film, comprising the steps of:

(A) producing a substrate having a polymerization initiating layer in which a polymer having, on a side chain thereof, a crosslinking group and a functional group having polymerization initiating capability is immobilized by a crosslinking reaction on a base material;

(B) generating a graft polymer by chemically bonding a polymer having a functional group that interacts with an electroless plating catalyst or a precursor thereof directly onto the entire surface of the polymerization initiating layer;

(C) adding the electroless plating catalyst or precursor thereof to the graft polymer; and

(D) forming a metal layer by electroless plating.

21. A conductive film forming method according to Claim 20,

wherein the step (B) further comprises:

a step (B-1) of generating an active site on the polymerization initiating layer by applying energy to the surface of the particular polymerization initiating layer after contacting a compound having a polymerizable group and a functional group that interacts with the electroless plating catalyst or precursor thereof with the polymerization initiating layer; and then generating, with the active site as a base point, a graft polymer having a functional group that interacts with the electroless plating catalyst or precursor thereof and chemically bonding directly to the surface of the polymerization initiation layer.

22. The conductive film forming method according to Claim 20, further comprising a step (E) of carrying out electroplating after the step (D).

23. The conductive film forming method according to Claim 20 wherein the substrate is a substrate having a surface roughness of 500 nm or less.

24. A conductive film formed on a substrate having a surface roughness of 500 nm or more, wherein the substrate comprises a polymerization initiating layer in which a polymer having, on a side chain thereof, a crosslinking group and a functional group having polymerization initiating capability is immobilized by a crosslinking reaction on a base material, wherein the conductive film is formed on the

substrate by forming on the polymerization initiating layer a polymer layer in which a polymer having a functional group that interacts with an electroless plating catalyst or a precursor thereof is chemically bonded directly on the particular polymerization initiating layer, adding the electroless plating catalyst or precursor thereof to the polymer layer, and carrying out electroless plating on the polymer layer, and wherein the polymer layer has a region having dispersed therein fine particles comprising at least one of electroless plating catalyst particles and metal particles deposited by the electroless plating, in a content of 25% by volume or more, and the region extending 0.05 μm or more from the interface of the polymer layer and the metal layer in a direction toward the substrate.